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Date: 05/05/2005
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52. The method of claim 51, wherein the vector is a plasmid.
53. The method of claim 51, wherein the vector is a virus.
54. The method of claim 53, wherein the virus is an adenovirus.
55. The method of claim 53, wherein the virus is a retrovirus.
56. The method of claim 49, wherein the osteogenic precursor cells are transfected *ex vivo*.
57. The method of claim 49, wherein the osteogenic precursor cells are transfected *in vivo* by direct injection of the isolated nucleic acid molecule.
58. The method of claim 49, wherein the LIM mineralization protein is HLMP-1 (SEQ ID NO: 10).
59. The method of claim 49, wherein the LIM mineralization protein is HLMP-1s (SEQ ID NO: 34).
60. The method of claim 49, wherein the LIM mineralization protein is RLMP (SEQ ID NO: 1).
61. The method of claim 57, wherein the isolated nucleic acid molecule is in a vector selected from the group consisting of a plasmid and a virus.
62. The method of claim 61, wherein the vector is a plasmid, which plasmid is directly injected into muscle tissue.
63. A method of stimulating production of an osteogenic soluble factor by an osteogenic cell, comprising:
 - (a) transfecting the osteogenic cell with an isolated nucleic acid molecule comprising a nucleotide sequence encoding LIM mineralization protein; and